

CORNER GUARD FOR PRE-HUNG DOOR ASSEMBLY**INVENTORS: John D. VanderWerf, Thomas E. Levitt, Paul L. Verstrate****BACKGROUND OF THE INVENTION****1. Technical Field:**

10 The present invention relates generally to protective packaging devices and in particular to protective packaging devices for protecting pre-hung door assemblies during transport and handling.

2. Description of the Related Art:

15 Responding to the prevalent popularity of delivering doors and door frames as pre-assembled units, door manufacturers and distributors have devised different types of protective packaging devices for protecting these products in assembled form while in storage and transit. Each of these protective package devices is essentially designed to protect the door assemblies from outer surface damage and to securely retain the hinged door within its frame. To this end, a variety of protective devices have been developed
20 that protectively cover the corners of the assemblies and/or prevent the door from swinging free of the frame. A common approach to protecting the corner areas of a pre-hung door assembly is to install corrugated cardboard corner guards at each of the four corner regions of the door assembly. Such corrugated cardboard corner guards are typically folded and glued into suitable box-like pockets that fit relatively loosely around
25 the respective corner regions of the door assembly and are held in place with straps. However, due to the tendency of cardboard corner guards to slip off or tear during shipment handling, alternate corner guard designs are becoming increasingly popular.

30 Alternative corner guards, made of plastics or similar high-tensile strength materials, have been developed to replace the corrugated cardboard corner protectors. Referring to **Figures 1A and 1B**, for example, there are illustrated perspective views of a conventional "top" corner guard **10** and a conventional "bottom" corner guard **15** that are utilized, respectively, to protect one of two top corners and one of two bottom corners of

5 a pre-hung door assembly. Although the door assembly is not depicted in its entirety, it can be readily appreciated that such a door assembly includes a three-sided door frame comprising a pair of vertical side frame members (e.g. the hinge and strike jambs) joined by a cross frame member (e.g. head jamb). In this manner, the pre-hung door assembly is characterized as having two flush, right angle corners formed at the vertical-to-cross
10 frame junctions at its top side, and a pair of L-shaped bottom corner regions in which the bottom edge of the door is recessed by one to two inches from the bottoms of the vertical frame members that extend along the sides thereof.

Top corner guard **10**, depicted in **Figure 1A**, is representative of one of two such top corner guards utilized to protect the top corners of a door frame. As shown in **Figure**
15 **1A**, top corner guard **10** is deployed over and in flush contact with the right angle junction of frame members **6** of a pre-assembled door frame. Top corner guard **10** includes a pair of mutually perpendicularly opposing side flanges **12** that are securely fastened to the outside edge surfaces of a pair of frame members **6** by the use of staples **4** or other suitable attachment means. A triangular cross member flange **14** connectively
20 extends between side flanges **12** to form a three-sided composite that protects the surface of the top frame corner while simultaneously preventing the door **8** from swinging free from the door frame jambs.

Referring to **Figure 1B**, there is illustrated a conventional bottom corner guard **15** deployable on a bottom L-shaped region of a pre-hung door assembly. As depicted in
25 **Figure 1B**, bottom corner guard **15** includes a pair of side flanges **12** and cross member flange **14**, together providing protective and door retention functions analogous to those provided by top corner guard **10**. In contrast to the seamless three-sided construction of top corner guard **10**, bottom corner guard **15** requires a slot aperture separation between side flanges **12** through which the bottom of the vertical frame member **6** extends to
30 accommodate the L-shaped door edge-to-frame junction.

Being made of plastic or other high tensile strength and tear-resistant materials, top and bottom corner guards **10** and **15** need only be anchored, using wood staples or similar coupling means, to one side edge of the door frame thus eliminating the need to

5 be formed as pocket-like enclosures. However, the need for two distinctly different corner guard structures (i.e. corner guard 10 for top corners and corner guard 15 for bottom corners) significantly increases the cost of production for providing comprehensive corner guard protection for each pre-hung door assembly. Furthermore, bottom corner guard 15 fails to cover and therefore protect the bottom edge and corner
10 surfaces of frame member 6.

Figure 2 illustrates a door-to-frame strap 16, which may be constructed of plastic or like material, that addresses the problem of leaving the bottom edge and corner surfaces of frame member 6 exposed. Door-to-frame strap 16 includes a flat strip 18 that is secured to the bottom edge of door 8 by the use of staples 4 or other suitable
15 attachment means, and furthermore includes a corner flange 17 having a hook-like or L-shaped contour enabling corner flange 17 to conformably grip and cover the corner edges of the bottom of frame member 6. As shown in **Figure 2**, strip 18 is a substantially flexible member that flexes in a bow like manner toward the corner flange 17 thus enabling door-to-frame strap 16 to accommodate a variety of different frame-member-to-
20 door offset distances.

The corner protection devices shown in **Figures 1A** and **1B** requires at least two different types of corner guards to cover the right angle top corners and L-shaped bottom corners of a pre-hung door assemblies, and furthermore fails to adequately protect the two L-shaped bottom corner regions where the vertical frame member extends below the
25 bottom edge of the door. While the door-to-frame strap 16 depicted in **Figure 2** protectively covers the bottom corners of the vertical frame members extending beyond the bottom edge of the door 8, the single connective attachment point on the bottom edge of door 8 combined with a lack of frontal retention support, such as that provided by cross member flanges 14, leaves door-to-frame strap 16 vulnerable to being dislodged
30 and otherwise insufficient for retaining door within the frame.

It can therefore be appreciated that a need exists for an improved corner guard for pre-hung door assemblies. The present invention addresses such a need.

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SUMMARY OF THE INVENTION

An improved corner guard for use on a pre-hung door assembly is disclosed herein. The corner guard of the present invention is designed for use with a pre-hung door assembly that includes a door secured within a three-sided door frame in which the two vertical frame members extend in an offset manner below the bottom edge of the pre-hung door. In a preferred embodiment, the corner guard includes a bumper member for imposing a gap between adjacent stacked assemblies. A substantially flat transition flange member is attached to one end of the base of the bumper member, and together, the transition flange member and bumper member base form a retention barrier surface across the front corner region of the pre-hung door assembly to maintain the door securely seated within the door frame. A fixed side flange is affixed to the other end of the bumper member and extends approximately perpendicularly with respect to the bumper member base surface such that a right angle inner surface corner contour is formed therebetween. The corner guard further includes an outwardly extensible lip member affixed to the other end of the transition flange member for enabling the corner guard to be deployed either to a right angle top corner or an L-shaped bottom corner region of the pre-hung door assembly.

All objects, features, and advantages of the present invention will become apparent in the following detailed written description.

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BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself however, as well as a preferred mode of use, further objects and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction
10 with the accompanying drawings, wherein:

Figures 1A and 1B depict perspective views of conventional plastic corner guards deployable on a top right angle junction and on a bottom L-shaped corner region of a pre-hung door assembly;

Figure 2 is a front view depicting a conventional door-to-frame strap utilized to
15 protectively cover the bottom-extending portion of a vertical frame member;

Figure 3A is a front profile view illustrating a corner guard applicable to a top or bottom corner of a pre-hung door assembly in accordance with a preferred embodiment of the present invention;

Figures 3B and 3C are alternate perspective views of the corner guard depicted in
20 **Figure 3A**; and

Figures 4A-4C illustrate the corner guard of the present invention deployed on the top and bottom corners of a pre-hung door assembly in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The present invention is described in a preferred embodiment in the following description with reference to the figures. While this invention is described in terms of the best mode for achieving this invention's objectives, it will be appreciated by those skilled in the art that variations may be accomplished in view of these teachings without deviating from the spirit or scope of the present invention.

With reference now to the figures, wherein like reference numerals refer to like and corresponding parts throughout, and in particular with reference to **Figures 3A-3C**, there are depicted a front profile view and alternate front and rear perspective views of a corner guard **20** designed in accordance with a preferred embodiment of the present invention. Specifically, corner guard **20** includes a frontal barrier member comprising a bumper member **22** attached to a transition flange **24**. As depicted in further detail with reference to **Figure 3C** and **Figures 4A-4C**, the frontal barrier member formed by the combination of bumper member **22** and transition flange **24** provides an inner base surface **23** across a front corner region of a pre-hung door assembly **35** such that the object door is secured (i.e. remains seated) within the door frame jambs. In addition to providing door retention functionality, bumper member **22** preferably has a raised, bumper-like outer contour that creates an inter door assembly gap between adjacently stacked door assemblies to prevent protruding members such as door hinges from damaging the door surface. In order to ensure an adequate inter door assembly gap, the height, H , of bumper member **22** must exceed the distance that a standard door hinge (not depicted) protrudes from the front of a door frame assembly, and, balancing the need for adequate clearance against cost of materials, is preferably set between 0.875" and 1.25". In addition to increased cost of materials, increasing the height, H , of bumper member **22** without proportionately increasing its width, W , compromises its stability in terms of resistance to bending or folding when the weight of an adjacent door frame assembly is applied against it. Therefore, and in accordance with the foregoing height dimension range, the width, W , of bumper member **22** is preferably set between 1.25" and 1.50" such that the resultant width-to-height ratio of bumper member **22** is at least 1.0. As an

- 5 additional stabilization feature, bumper member **22** preferably includes a substantially flat outer bumper surface **21**.

Affixed to the end of bumper member **22**, opposing the end attached to transition flange **24**, is a fixed side flange **26** that extends substantially perpendicularly with respect to the inner base surface **23** of the frontal barrier member such that a right angle inner
10 surface corner contour is formed therebetween. As illustrated in **Figure 3C** and **Figures 4A-4C**, the right angle corner junction between inner base surface **23** and side flange **26** provides a suitably contoured forum in which corner guard **20** may be securely braced at one end onto a rectangular frame member.

In an important feature of the present invention, corner guard **20** further includes
15 an outwardly extensible lip member **28** coupled to transition flange **24**. As depicted in the figures herein, lip member **28** is a resiliently flexible strip-like member having a proximal end fixedly attached to the frontal barrier member at the end of transition flange **24**. Lip member **28** further includes a free distal end at which lip member **28** is extensible in a flexible, bow-like manner outward and away from the frontal barrier
20 member comprising bumper member **22** and transition flange **24**. Similar to the right angle junction formed between side flange **26** and the barrier surface **23** of the frontal barrier member, the mutual disposition of the flat strip portion of lip member **28** is perpendicular with respect to inner base surface **23**, thus providing a right angle brace between transition flange **24** and the proximal end of lip member **28** for securely bracing
25 the end of the frontal barrier member onto a rectangular frame member or the bottom door edge.

With reference to **Figures 4A-4C**, there is illustrated the corner guard of the present invention deployed on the top and bottom corners of a pre-hung door assembly in accordance with a preferred embodiment of the present invention. As shown in **Figure**
30 **4C**, a pre-hung door assembly **35** includes a three-sided door frame comprising a pair of vertical frame members (e.g. the hinge and strike jambs) **36** joined by a cross frame member (e.g. head jamb) **34**. In this manner, pre-hung door assembly **35** is characterized as having two flush, right angle corners formed at the vertical-to-cross frame junctions at its top side, and a pair of L-shaped bottom corner regions in which the bottom side of the

5 door is recessed by one to two inches from the bottoms of the vertical frame members that extend along the sides thereof. Door 32 is attached to one of the side jambs 36 known as the "hinge jamb," by two or more door hinges (not depicted). The inter door assembly gap of between 0.875" and 1.25" provided by bumper member 22 prevents the protruding metallic hinges from damaging the wood surface of an adjacent door assembly
10 surface. Furthermore, the inner base surface 23 provided by the frontal barrier member comprising bumper member 22 and transition flange 24, prevents door 32 from swinging free from its seated position within the door frame members. Referring to **Figures 3A-3C** in conjunction with **Figures 4A-4C**, it will be noted that corner guard 20 may be formed in one of two complementary orientations, with the corner guard embodiment
15 depicted in **Figures 3A-3C** deployable on the upper left corner or lower right corner of a pre-hung door assembly 35, and a similarly constructed but oppositely oriented corner guard deployable on the upper right and lower left corners.

Figures 3B and **3C** illustrate alternate perspective views of corner guard 20 showing the relative positioning of side flange member 26, transition flange 24, and
20 outwardly extensible lip member 28 relative to the outer and inner contours of the frontal barrier member comprising bumper member 22 and transition flange 24. As explained above, inner base surface 23, comprising the underneath surfaces of bumper member 22 and transition flange 24, serves a retention function in retaining a door within a three-sided door frame or jamb assembly. The anchoring required for such door-to-frame
25 retention is provided by affixing fixed side flange member 26 in flush surface contact with a frame member and affixing lip member 28 over a corner edge of the object pre-hung door assembly as shown in **Figures 4A-4C**. Staples or other suitable coupling means may be utilized to secure fixed side flange member 26 and the proximal flat end of lip member 28 to the sides of frame members or door edges.

30 As depicted in **Figures 3A-3C**, corner guard 20 has a substantially triangular overall profile with lip member 28 resting in its non-extended position. In this manner, and as depicted in **Figures 4A-4C**, corner guard 20 provides a geometrically robust triangular bracing structure for securing the two top corners of a pre-hung door assembly 35. This substantially triangular profile is maintained when corner guard 20 is deployed

5 onto a top corner, which as previously explained, forms a right angle junction, such as that depicted in **Figures 4A** and **4C**, showing corner guard **20** secured to a “top” corner region area at which head jamb **34** joins one of two side jambs (either a strike or a hinge jamb) **36**. In this configuration, the distal end of lip member **28** extends in a substantially straight, non-flexed manner toward the right angle corner defined by the junction of head
10 jamb **34** and side jamb **36**.

In an important feature of the present invention, flexible lip member **28** enables corner guard **20** to assume a suitably different profile when corner guard **20** is deployed onto the L-shaped corner region of pre-hung door assembly **35**. Specifically, and as depicted in **Figures 4B** and **4C**, the flat strip portion of lip member **28** flexes in a bow-
15 like manner at its free distal end, thus enabling an L-shaped or hook-like corner flange **25** to be secured onto the end of the vertical frame member over a range of different frame-member-to-door offset distances. Corner flange **25** preferably has a hook-like or L-shaped contour enabling corner flange **25** to conformably grip and cover the corner edge of the bottom of the object vertical frame member. The flat strip portion at the proximal
20 end of lip member **28** is preferably secured to the bottom edge of door **32** by the use of staples (not depicted) or other suitable attachment means.

In a preferred embodiment, the frontal barrier member comprising bumper member **22** and transition flange **24**, together with fixed side flange member **26** and outwardly extensible lip member **28** are integrally formed as a single plastic unit
25 manufactured by injection molding or similar technique. Furthermore, the polymer or other plastic material utilized to integrally form corner guard as a single integral unit is characterized as having plastic resiliency, or “memory,” such that in the absence of a flexing force, lip member **28** returns to its substantially straight, unflexed contour.

While this invention has been described in terms of several embodiments, it is
30 contemplated that alterations, permutations, and equivalents thereof will become apparent to one of ordinary skill in the art upon reading this specification in view of the drawings supplied herewith. It is therefore intended that the invention and any claims related

- 5 thereto include all such alterations, permutations, and equivalents that are encompassed by the spirit and scope of this invention.